UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,716	01/11/2002	John Langenfeld	270/070	1276

26259 7590 05/26/2006

LICATLA & TYRRELL P.C.
66 E. MAIN STREET
MARLTON, NJ 08053

EXAMINER	
RAWLINGS, STEPHEN L	

ART UNIT	PAPER NUMBER
1643	

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/044,716	LANGENFELD, JOHN	
	Examiner	Art Unit	
	Stephen L. Rawlings, Ph.D.	1643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2006 and 15 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6 and 17-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6 and 17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 May 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 15, 2006, has been entered.

1. The amendment filed February 17, 2006, has been entered. Claims 1, 6, 18, and 19 have been amended.

2. Claims 1, 6, and 17-19 are pending in the application and are currently under prosecution.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. The following Office action contains NEW GROUNDS of rejection necessitated by amendment.

Election/Restrictions

5. Applicant has amended claim 1 so that claims 1 and 17-19 are presently drawn to the subject matter of the elected species of invention as well as to the subject matter of other non-elected species of invention; see section 8 at page 12 of the Office action mailed October 20, 2004. Accordingly, Applicant's traversal of the restriction and election requirement set forth at page 13 of the amendment filed January 13, 2005, is no longer moot; see section 7 at pages 3 and 4 of the Office action mailed April 25, 2005.

Applicant's argument traversing the election requirement has been carefully considered but not found persuasive for the following reasons:

Applicant has argued that human noggin and mouse noggin are so closely related that a search and examination of the entire claim can be made without serious burden. Furthermore, Applicant has argued the requirement is improper because there is unity of invention, as the polypeptides share a substantial structural feature that is essential to their common utility.

In response, contrary to Applicant's assertion, the search necessary to consider claims directed to any one species of the elected invention is not the same, nor is it coextensive with the search necessary to consider claims directed to any other species of invention. Therefore, consideration of claims directed to each different species would require performance of a different search; and the need to perform more than one search would be unduly burdensome. Because the different species of invention are patentably distinct and because the need to search claims directed to more than one of the species would constitute a serious burden the requirement is proper. See M.P.E.P. § 809.

Furthermore, the claims are not merely drawn to the species of invention, wherein the inhibitor of BMP-2 is mouse noggin or human noggin. The claims also encompass other species of invention, wherein the inhibitor of BMP-2 is a chordin, gremlin, cerberus 1 homolog, or DAN polypeptide. Although the specification describes human noggin and mouse noggin as having amino acid sequences that are 98% homologous, the specification does not describe a substantial structure feature shared by more than one of these different polypeptides, which is essential to their common utility in practicing the claimed invention. Moreover, while mouse noggin and human noggin may be 98% homologous, neither the specification nor Applicant describes the substantial structural features, which are identical in both proteins and essential to their common ability to antagonize binding of BMP-2 to BMP-2 receptor and thereby treat lung cancer.

Accordingly, the restriction and election requirement is still proper and therefore again made FINAL.

Grounds of Rejection Withdrawn

6. Unless specifically reiterated below, Applicant's amendment and/or arguments filed February 17, 2006, have obviated or rendered moot the grounds of objection and rejection set forth in the previous Office action mailed October 26, 2005.

Grounds of Rejection Maintained

7. The rejection of claims 1, 6, and 17-19 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, is maintained.

At pages 6-10 of the amendment filed February 17, 2006, Applicant has traversed this ground of rejection.

Applicant's arguments have been carefully considered but not found persuasive for the following reasons:

Applicant has argued the amendment to the claims has obviated this ground of rejection since the specification teaches at paragraphs [0056]-[0058] that noggin, chordin, gremlin, cerberus 1 homolog, and DAN bind to BMP-2, thereby preventing the interaction of BMP-2 with its receptor. In response, paragraph [0058] teaches polypeptide fragments of noggin, chordin, pemlin, Cerberus I homolog, and DAN that bind BMP-2 and inhibit its activity, but contrary to Applicant's assertion paragraphs [0056]-[0058] do not teach or fairly suggest noggin, chordin, gremlin, cerberus 1 homolog, and DAN bind to BMP-2, thereby preventing the interaction of BMP-2 with its receptor.

Applicant has asserted support for the amendment to the claims is found in paragraphs [0056]-[0058]. While the disclosure in these paragraphs may describe mature human noggin as comprising the amino acid sequence spanning residues 20-231 of the amino acid sequence set forth as SEQ ID NO: 4, it does not describe this protein as capable of antagonizing binding of BMP-2 to BMP-2 receptor.

Applicant has argued their own publications, which were published in 2003 and 2004, support their assertion that the invention can be used without undue and/or unreasonable experimentation because contrary to the Office's position it is not necessary that the role of BMP-2 in cancer be established prior to its use. The Office's position is based in part on the teachings of those particular publications to which Applicant has referred, which clearly indicate the need to establish the role of BMP-2 in cancer before practicing any method for treating cancer that utilizes an agent that targets BMP-2.

Applicant has argued that the specification, as filed, provides sufficient guidance, direction and exemplification to enable the skilled artisan to use the claimed invention to treat lung cancer without undue and/or unreasonable experimentation. In reply, after careful consideration of the factors used to determine whether undue experimentation is required, in accordance with the Federal Circuit decision of *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir. 1988), it appears there is a preponderance of factual evidence of record that the specification, as filed, would not be sufficient to have enabled the skilled artisan to use the claimed invention at the time the application was filed without undue and/or unreasonable experimentation.

Applicant has argued that they have used a *bona fide* animal model to demonstrate the utility of the claimed invention. To the contrary, as explained in detail in the preceding Office actions, the use of the claimed invention has not been exemplified. The only experiments that are described in the specification are experiments in which agarose beads coated with mouse noggin were coinjected together with A549 tumor cells into nude (i.e., immunocompromised) mice. This "model" does not exemplify the use of the claimed invention, as it does not involve treating lung cancer in a subject (e.g., a patient) afflicted with lung cancer by administering to the subject a therapeutically effective amount of the polypeptide of SEQ ID NO: 4. Moreover, as explained thoroughly in the preceding Office action, there is a preponderance of factual evidence of record that the results acquired in the disclosed experiments cannot be extrapolated to reliably predict the outcome of practicing the invention as claimed.

Applicant is again reminded that although Langenfeld et al. (2004) (of record) discloses the results of similar, if not identical experiments *suggest* BMP-2 may promote angiogenesis by stimulating endothelial cells (not tumor cells), such that inhibition of BMP-2 may inhibit angiogenesis, which, in turn, may inhibit tumor formation (see, e.g., page 147, column 1), Langenfeld et al. (2002) (of record) discloses the role of BMP-2 in cancer has not yet been established since others have reported conflictive results. Most notably, Takada et al. (of record) has utilized the same tumor cell line (i.e., A549) to study the role of BMP-2 on its growth and found BMP-2 *suppresses* its growth. Buckley et al. (of record) reports similar results, showing that BMP-2 suppresses the transformed phenotype of A549 cell; and still others (of record) have shown that BMP-2 suppresses the growth of other types of tumor cells. As explained in the preceding Office action, the conflictive results that have been acquired using A549 cells fail to establish the role of BMP-2 in cancer; accordingly, these same conflictive results fail to establish a practical rationale for inhibiting the activity of BMP-2 in patients as a means for treating lung cancer. Moreover, in light of all that is known now about the role of BMP-2 in lung cancer, the skilled artisan would not accept the assertion that the claimed invention could be immediately practiced in a clinical setting to treat lung cancer in patients, certainly not without first performing the undue and unreasonable experimentation necessary to establish the practicality and effectiveness of doing so.

This position is further supported by the teachings of Hardwick et al. (of record), which, as explained in the preceding Office actions, reveal that BMP-2 acts as a tumor suppressor. Although their study shows the protein promotes apoptosis and differentiation and inhibits proliferation of mature colonic epithelial cells, as opposed to lung cancer cells, it is still believed highly relevant to the issue at hand, since contrary to the presumed utility of administering to a patient diagnosed with cancer an inhibitor of BMP-2 activity, which asserted in this application, Hardwick et al. discloses that *administering noggin to mice led to reduced apoptosis of colon cells*. Hardwick et al. concludes, as loss of BMP signaling appears to lead to decreased apoptosis, its loss would be expected to be associated with increased carcinogenesis (page 120). Accordingly, it follows that inhibiting the activity of BMP-2 by, e.g., administering noggin

to a patient would not be effective to inhibit the growth of tumor cells in the patient, but would instead promote their growth. Collectively, there is a preponderance of evidence that the role of BMP-2 in cancer must first be established before it would become practical to try to use the claimed invention to treat lung cancer in patients afflicted by the disease.

Applicant has argued M.P.E.P. 2164.02 states that if the art is such that a particular model is recognized as correlating to a specific condition, then it should be accepted as correlating unless the examiner has evidence that the model does not correlate. In this instance, the specification does not describe experiments that "model" the claimed invention, and as such it is not possible to consider whether the model should be accepted as correlative (i.e., predictive of the outcome of practicing the same method in humans). The claimed invention is a method for treating lung cancer in a patient by administering to the patient a therapeutically effective amount of the polypeptide of SEQ ID NO: 4 to antagonize binding of BMP-2 to BMP-2 receptor, and as such the objective of practicing the claimed invention is necessarily to achieve therapeutic effect; the claimed invention is not a method for inoculating a patient with tumor cells together with an effective amount of the polypeptide of SEQ ID NO: 4 to antagonize binding of BMP-2 to BMP-2 receptor. Therefore, contrary to Applicant's arguments, the use of the claimed invention has not been *modeled*.

Applicant has argued that although the effectiveness of human noggin has not been determined, because mouse noggin and human noggin are 98% homologous, the skilled artisan would readily appreciate that whether the antagonist used in practicing the claimed invention is mouse noggin, human noggin, chordin, cerberus 1 homolog, or DAN, therapeutic benefit will be achieved. The Examiner strongly disagrees with this assertion. The fact that mouse noggin and human noggin are 98% homologous does not reasonably suggest that any of chordin, cerberus 1 homolog, and DAN could be used in place to either mouse noggin or human noggin. Furthermore, it is noted that Skolnick et al. (*Trends in Biotechnology* 2000; **18**: 34-39), for example, discloses that the skilled artisan is well aware that assigning functional activities for any particular protein or protein family based upon sequence homology is inaccurate, in part because

of the multifunctional nature of proteins (see, e.g., the abstract; and page 34, *Sequence-based approaches to function prediction*). Even in situations where there is some confidence of a similar overall structure between two proteins, only experimental research can confirm the artisan's best guess as to the function of the structurally related protein (see, in particular, the abstract and Box 2).

The fact that mouse noggin and human noggin are 98% homologous should not be confused as an indication that the proteins share substantial identity, as "homology" is a term of art used only to indicate similarity[1].

Nonetheless, the skilled in the art would not accept the assertion, which is based only upon an observed similarity in amino acid sequence, that a variant of the polypeptide of SEQ ID NO: 6, such as the polypeptide of SEQ ID NO: 4 or any of chordin, cerberus 1 homolog, and DAN, is functionally equivalent to the polypeptide of SEQ ID NO: 6, or even has a structure that is substantially equivalent to that of the polypeptide of SEQ ID NO: 6.

In addition, although both the polypeptide of SEQ ID NO: 4 and the polypeptide of SEQ ID NO: 6 are disclosed as having the ability to inhibit formation of a tumor in nude mice inoculated with A549 cells in the presence of agarose beads coated with the polypeptide, the specification does not describe which amino acid residues of either polypeptide are essential to that activity or which must be retained to preserve that activity. Moreover, the specification does not teach which amino acids in the sequence of the polypeptide can be replaced, and by which other amino acids, without a loss of that activity. Again, as evidenced by the teachings of Skolnick et al., for example, the skilled artisan cannot accurately and reliably predict whether a given homologue of a particular protein known to have a certain activity will also have that activity.

In addition, the skilled artisan cannot reliably and accurately predict the functional and structural consequences of amino acid differences; but the more structurally

[1] "Homology" is defined, for example, by Merriam-Webster Online Dictionary, which available on the Internet at http://www.merriam-webster.com/, as "similarity of nucleotide or amino-acid sequence in nucleic acids, peptides, or proteins" (copyright 2005 by Merriam-Webster, Incorporated). Homology or similarity of nucleic acid sequences may be evaluated by relatively subjective criterion, or it may be objectively measured using any of wide variety of differing criterion.

disparate a given protein, the less likely the protein will share the function of structurally related proteins having known functions. Burgess et al. (*Journal of Cell Biology* 1990; **111**: 2129-2138) exemplifies the sensitivity of proteins to alterations of even a single amino acid in a sequence. Burgess et al. teaches that replacement of a single lysine reside at position 118 of acidic fibroblast growth factor by glutamic acid led to the substantial loss of heparin binding, receptor binding and biological activity of the protein. As another example of this sensitivity to amino acid sequence variations, Lazar et al. (*Molecular and Cellular Biology*, 1988, **8**: 1247-1252) teaches that a replacement of aspartic acid at position 47 with alanine or asparagine in transforming growth factor alpha had no effect but that a replacement with serine or glutamic acid sharply reduced its biological activity. Thus, Lazar et al. teaches that even a single *conservative* type amino acid substitution may adversely affect the function of a protein.

Thus, contrary to Applicant's argument, the skilled artisan would *not* readily appreciate that any of mouse noggin, human noggin, chordin, cerberus 1 homolog, and DAN could be used in practicing the claimed invention to achieve therapeutic benefit. In deciding *In re Fisher*, 166 USPQ 18, 24 (CCPA 1970), the Court indicated the more unpredictable an area is, the more specific enablement is necessary in order to satisfy the statute. It has been well known to those skilled in the art at the time the invention was made that even minor structural differences among structurally related compounds or compositions could result in substantially different biological and pharmacological activities.

Double Patenting

8. The provisional rejection of claims 1, 18, and 19 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 14 of copending Application No. 10/692,824. Although the conflicting claims are not identical, they are not patentably distinct from each other for reasons set forth in section 8 of the preceding Office action mailed October 26, 2005.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

At page 11 of the amendment filed February 17, 2006, Applicant has requested that this issue be held in abeyance until allowable subject matter has been identified in the copending application.

Applicant's request is acknowledged.

New Grounds of Objection

Claim Objections

9. Claims 1 and 17-19 are objected to as being drawn in the alternative to the subject matter of a non-elected species of invention.

10. Claim 6 is objected to because the claim recites, "wherein the noggin polypeptide human noggin of SEQ ID NO:4". Appropriate correction is required.

New Grounds of Rejection

Claim Rejections - 35 USC § 112

11. Claims 1, 6, and 17-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

This is a "new matter" rejection.

Claims 1, 6, and 17-19 are directed to a method comprising administering to a patient with lung cancer a therapeutically effective amount of a noggin polypeptide to antagonize binding of BMP-2 to BMP-2 receptor.

At page 5 of the amendment filed February 17, 2006, Applicant has asserted that the amendment adds no new matter but does not indicate where in the specification, as filed, support for the amendment to the claims is found.

At page 7 of the amendment Applicant has asserted support for the amendment to the claims is found in paragraphs [0056]-[0058]; and it is furhter noted Applicant has argued at page 6 of the amendment, "[g]iven that these polypeptides are known in the art and further known to antagonize binding of BMP-2 to BMP-2 receptor, one of skill in the art would readily recognize in Applicants disclosure that Applicant was in possession of that which is now claimed".

Without intending to acquiesce to the latter assertion, the specification, including the claims, as originally filed, does not appear to provide written support for the language of the claims because it does not describe a noggin polypeptide, or more particularly the human polypeptide of SEQ ID NO: 4 as antagonizing binding of BMP-2 to its receptor. At paragraph [0057] of the published application (i.e., U.S. Application Publication No.), the specification discloses:

> A "bone morphogenetic protein-2 activity inhibitor" is a composition that antagonizes the activity of the BMP-2 protein by specifically binding to it or to BMP receptors, blocks the activation of pro-BMP-2, or prevents the replication or transcription of the BMP-2 gene or the translation of BMP-2 MRNA into protein".

This disclosure, however, does not appear to provide written support for treating lung cancer by administering an effective amount of a noggin polypeptide to antagonize binding of BMP-2 to BMP-2 receptor. Accordingly, while perhaps this issue might be resolved if Applicant were to point to particular disclosures in the specification, as filed, which are believed to provide the necessary written support, at present, it appears the amendment has introduced new matter, thereby violating the written description provision set forth under 35 U.S.C. § 112, first paragraph.

It is recognized that the Examiner suggested a prior issue might be remedied if claim 1 were amended to recite, for example, "administering to a patient with lung cancer a therapeutically effective amount of the polypeptide of SEQ ID NO: 4 to antagonize binding of BMP-2 to its receptor"; see paragraph 3 at page 15 of the preceding Office action mailed October 26, 2005. The Examiner regrets any inconvenience caused by this earlier suggestion, but it is not now apparent why the

Examiner believed such an amendment would be supported by the specification, as filed.

12. Claims 1 and 17-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

This is a "written description" rejection.

The considerations that are made in determining whether a claimed invention is supported by an adequate written description are outlined by the published Guidelines for Examination of Patent Applications Under the 35 U.S.C. 112, para. 1, ``Written Description" Requirement (Federal Register; Vol. 66, No. 4, January 5, 2001). A copy of this publication can be viewed or acquired on the Internet at the following address: <http://www.gpoaccess.gov/>.

Claims 1 and 17-19 recite, "a therapeutically effective amount of a noggin polypeptide to antagonize binding of bone morphogenetic protein-2 (BMP-2) to BMP-2 receptor". Accordingly the claims are directed to a genus of "noggin polypeptides".

The specification describes human noggin (i.e., the polypeptide of SEQ ID NO: 4) and mouse noggin (i.e., the polypeptide of SEQ ID NO: 6). The specification describes these particular "noggin polypeptides" as having amino acid sequences that are 98% homologous; see, e.g., paragraph [00101], page 36, lines 3 and 4.

The specification, however, does not describe the genus of "noggin polypeptides" to which the claims are directed as consisting of the polypeptide of SEQ ID NO: 4 and the polypeptide of SEQ ID NO: 6; therefore, it is presumed that the genus of polypeptides includes other members that have not been described with any degree of particularity.

For this reason, it is not apparent that the polypeptides of SEQ ID NO: 4 and SEQ ID NO: 6 are representative of the genus as a whole because the specification does not describe the members of the genus, including the polypeptides of SEQ ID NO:

4 and SEQ ID NO: 6, as necessarily having any particularly identifying structural or functional features. Moreover, while the mouse and human polypeptides are 98% homologous, the specification does not describe to what extent they are identical, or whether they share any substantial structural feature (e.g., domain, motif), which correlates with any one particularly identifying functional feature also shared by the proteins.

What structural and/or functional features, which are shared by at least a substantial number of the members of the genus of "noggin polypeptides", would permit the skilled artisan to immediately envision, recognize or distinguish those members?

Giving the claims the broadest, reasonable interpretation, the "noggin polypeptide" is not limited to either of the disclosed "noggin polypeptides" but is instead any member of a genus of polypeptides that may vary markedly in both structure and function.

Guidelines for Examination of Patent Applications Under the 35 U.S.C. 112, paragraph 1, ``Written Description" Requirement (66 FR 1099-1111, January 5, 2001) states, "[p]ossession may be shown in a variety of ways including description of an actual reduction to practice, or by showing the invention was 'ready for patenting' such as by disclosure of drawings or structural chemical formulas that show that the invention was complete, or by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention" (*Id.* at 1104). "Guidelines" further states, "[f]or inventions in an unpredictable art, adequate written description of a genus which embraces widely variant species *cannot* be achieved by disclosing only one species within the genus" (Id. at 1106); accordingly, it follows that an adequate written description of a genus cannot be achieved in the absence of a disclosure of at least one species within the genus. Because the claims encompass a genus of variant species, an adequate written description of the claimed invention must include sufficient description of at least a representative number of species by actual reduction to practice, reduction to drawings, or by disclosure of relevant, identifying characteristics sufficient to show that Applicant was in possession of the claimed genus. However, factual evidence of an actual reduction to practice has not been disclosed by

Applicant in the specification; nor has Applicant shown the invention was "ready for patenting" by disclosure of drawings or structural chemical formulas that show that the invention was complete; nor has Applicant described distinguishing identifying characteristics sufficient to show that Applicant had possession of the claimed invention at the time the application was filed.

Conclusion

13. No claim is allowed.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen L. Rawlings, Ph.D. whose telephone number is (571) 272-0836. The examiner can normally be reached on Monday-Friday, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Helms, Ph.D. can be reached on (571) 272-0832. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stephen L. Rawlings, Ph.D.
Examiner
Art Unit 1643

slr
May 18, 2006